IN THE SPECIFICATION:

Please change the title as follows:

~~AN~~ APPARATUS FOR MANUFACTURING MOLTEN IRONS TO DRY AND CONVEY IRON ORES AND ADDITIVES AND MANUFACTURING METHOD USING THE SAME

The paragraph beginning on page 1, line 7 has been changed as follows:

The ~~present~~ invention relates to an apparatus and method for manufacturing molten irons, and more particularly, to an apparatus and method for manufacturing molten irons in which iron ores and additives are dried while being conveyed, and then by the sensible heat of exhaust gas of a fluidized-bed reactors, the iron ores and additives are charged to the fluidized-bed reactors to thereby manufacture molten irons.

The paragraph beginning on page 3, line 18 has been changed as follows:

The ~~present~~ invention has been made in an effort to solve the above problems. The ~~present~~ invention provides an apparatus and method for manufacturing molten irons in which exhaust gas of a fluidized-bed reactor is used as conveying gas for conveying iron ores and additives, and, at the same time, its sensible heat is used to dry the iron ores and the additives such that costs associated with drying are reduced.

The paragraphs beginning on page 5, line 13 have been changed as follows:

FIG. 1 is a schematic view of an apparatus for manufacturing molten irons according to a first embodiment of the ~~present~~ invention.

FIG. 2 is a schematic view of an apparatus for manufacturing molten irons according to a second embodiment of the ~~present~~ invention.

The paragraphs beginning on page 5, line 19 have been changed as follows:

Preferred embodiments of the ~~present~~ invention will now be described in detail with reference to the accompanying drawings. It should be clearly understood that many variations and/or modifications of the basic inventive concepts may appear to those skilled in the present art. The embodiments are to be regarded as illustrative in nature, and not restrictive.

FIG. 1 is a schematic view of an apparatus for manufacturing molten irons according to an embodiment of the ~~present~~ invention. The apparatus dries and conveys iron ores and additives, and supplies the same to a fluidized-bed reactor.

An apparatus 100 for manufacturing molten irons according to a first embodiment of the ~~present~~ invention includes the main elements of a fluidized-bed reactor unit 20, a melter-gasifier 10, a raw material supplying unit 60, and other accessory equipments. The fluidized-bed reactor unit 20 includes one or more fluidized-bed reactors having a fluidized bed therein, and acts to reduce and calcine iron ores and additives to reduced material. The reduced material is charged to the melter-gasifier 10, which includes a coal packed bed therein, and oxygen is supplied to the melter-gasifier 10 to thereby produced molten irons. Reduced gas exhausted from the melter-gasifier 10 is used to reduce and calcine iron ores and additives through a fluidized-bed reactor, after which the reduced gas is exhausted to the outside.

The paragraph beginning on page 6, line 13 has been changed as follows:

The fluidized-bed reactors include a pre-heating reactor 23 for pre-heating the charged iron-containing compound, a preliminary reducing reactor 25 for performing preliminary reduction of the iron-containing compound pre-heated in the pre-heating reactor 23, and a final reducing reactor 27 for performing final reduction of the iron-containing compound that is reduced in the preliminary reducing reactor 25. In FIG. 1, although the

fluidized-bed reactors are shown to include three stages, such a configuration is for illustrative purposes and the ~~present~~ invention is not limited in this regard. Accordingly, a variety of different numbers of stages may be used for the fluidized-bed reactors. The iron ores and additives supplied to the fluidized-bed reactors forming a fluidized bed by contacting a high temperature reduced gas current therewith, and it is converted into a high temperature reduced material that is at a temperature of 80°C or more, is 80% or more reduced, and is 30% or more calcined.

The paragraph beginning on page 7, line 29 has been changed as follows:

The raw material supplying unit 60 that uses the exhaust gas exhausted from the fluidized-bed reactors includes an iron ore hopper 30, an additive hopper 40, and a conveying line L57, and acts to dry and convey iron ores and additives to the fluidized-bed reactor unit 20. Iron ores and additives discharged respectively from the iron ore hopper 30 and the additive hopper 40 are supplied to the rock hopper 21 through the conveying line L57 connected to an iron ores supply line L30 and an additive supply line L40. Among the fluidized-bed reactors, part of the exhaust gas exhausted from the pre-heating reactor 23 is supplied to the conveying line L57 through a branched exhaust gas branched line L55. The conveying line L57 is extended vertically, and iron ores and additives are supplied to the conveying line L57 at a location 1 ~ 2m higher than the supply position of exhaust gas. If iron ores and additives are supplied from a location 1 ~ 2m higher than the supply position of exhaust gas, scattering loss of the iron ores and additives occurring during drying and conveying is minimized, and the area of contact with the exhaust gas is maximized such that it is possible to dry and convey the iron ores and additives very efficiently. The supply position of the iron ores and additives from the conveying line L57 shown in FIG. 1 is used

for illustrative purposes and does not restrict the ~~present~~ invention. Accordingly, it is only necessary that the conditions described above be satisfied.

The paragraph beginning on page 9, line 5 has been changed as follows:

In the apparatus for manufacturing molten irons according to the first embodiment of the ~~present~~ invention, iron ores and additives are selectively supplied to the conveying line L57 according to operating conditions to thereby realize drying and conveying. In the case where additives are supplied to the conveying line L57 to realize drying and conveying, the valve V40 is opened while the valve V30 is closed such that only the additives are dried and conveyed: In this case, the flow speed of the exhaust gas supplied to the conveying line L57 is preferably 10 ~ 20m/s. If the flow speed of the exhaust gas is less than 10m/s, additives charged to a lower part of the conveying line L57 are not fully transported in the conveying line L57, and some particles are accumulated in the lower part of the conveying line L57. Therefore, a pressure at the lower part of the conveying line L57 is significantly increased such that flow in the conveying line L57 is made unstable. On the other hand, a flow speed of the exhaust gas exceeding 20m/s is not suitable since the grain size of the additives is too small. Here, the amount of iron ores that is processed is approximately 100 ~ 130 tons/day, and the amount of additives processed is approximately 15 ~ 30 tons/day.

Further, in the case where iron ores are supplied to the conveying line L57 to be dried and conveyed, the valve V30 is opened while the valve V40 is closed such that only the iron ores are dried and conveyed. In this case, the flow speed of the exhaust gas supplied to the conveying line L57 is preferably slightly greater. As a result of the greater particle size and density of the iron ores compared to the additives, the flow speed of the exhaust gas is preferably 20 ~ 30m/s. As described above, the iron ores and additives may be separately

dried and conveyed as in the first embodiment of the ~~present~~ invention, or may be mixed then dried and conveyed.

FIG. 2 is a schematic view of an apparatus for manufacturing molten irons according to a second embodiment of the ~~present~~ invention.

An apparatus 200 for manufacturing molten irons according to the second embodiment of the ~~present~~ invention shown in FIG. 2 is identical to that of the first embodiment except for a raw material supply unit 65. Accordingly, elements of the apparatus 200 for manufacturing molten irons identical to the elements of the first embodiment will not be described, and the explanation will be concentrated on the raw material supply unit 65.

The paragraph beginning on page 10, line 17 has been changed as follows:

The second embodiment of the ~~present~~ invention is used by connecting the conveying line L57 to the above apparatus. Iron ores are supplied to the conveying line L57 through an iron ore bypass line L33 connected to the iron ore supply line L31, and additives are supplied to the conveying line L57 through an additive bypass line L43 connected to the additive supply line L41. Accordingly, iron ores and additives are formed into an iron-containing mixture and dried immediately prior to supply to the fluidized-bed reactors having fluidized beds.

The paragraph beginning on page 11, line 9 has been changed as follows:

The ~~present~~ invention will be described in greater detail below through an experimental example. This experimental example merely illustrates the ~~present~~ invention and is not meant to limit the ~~present~~ invention.

The paragraphs beginning on page 12, line 15 have been changed as follows:

The ~~present~~ invention has the advantage of being able to use fine ores and fine additives. That is, by using iron ores and additives of a minimal grain size, these materials may be conveyed and simultaneously dried using exhaust gas.

In the ~~present~~ invention, since exhaust gas emitted from fluidized beds are branched and used, the amount of waste gas is reduced and energy may be reused.

The paragraph beginning on page 12, line 23 has been changed as follows:

Also, since the ~~present~~ invention may be applied to general drying assemblies, precautions may be taken against any problems that may occur with the drying assembly and load applied to the drying assembly may be dispersed such that the apparatus for manufacturing molten irons may be more flexibly operated.

The paragraph beginning on page 13, line 7 has been changed as follows:

Although embodiments of the ~~present~~ invention have been described in detail hereinabove in connection with certain exemplary embodiments, it should be understood that the invention is not limited to the disclosed exemplary embodiments, but, on the contrary is intended to cover various modifications and/or equivalent arrangements included within the spirit and scope of the ~~present~~ invention, as defined in the appended claims.